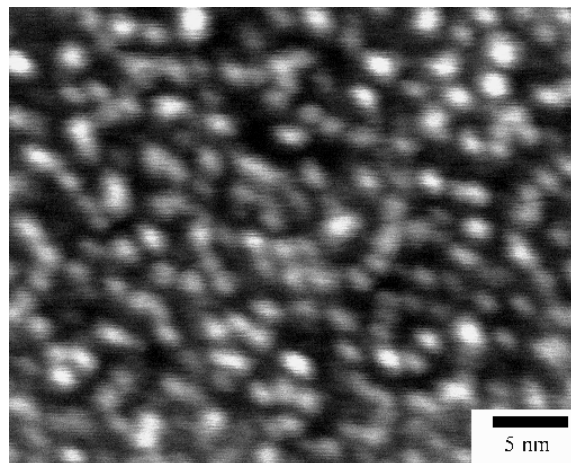


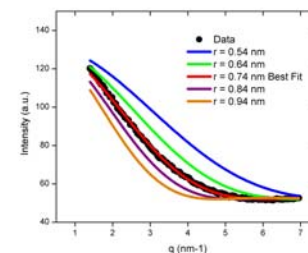
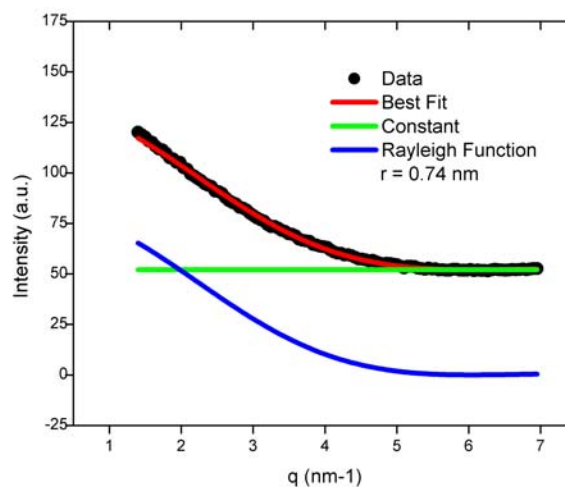
Controlling Ionomer Morphologies

Karen I. Winey, University of Pennsylvania, DMR- 0235106

During the previous year we significantly improved our electron microscopy methods as applied to ion-containing polymers. More recently, we have used a model system, undecagold particles, to develop imaging methods and scattering models to characterize 0.5 – 3 nm sized domains in polymers. Quantitative agreement has been found between STEM images and x-ray scattering data for undecagold. This model system has also been used to determine the optimal section thickness for STEM specimens by varying the thickness of the polystyrene support film.



STEM image of undecagold particles supported on a 20nm film of polystyrene. Mean diameter, as measured by line scans, is 1.3 ± 0.15 nm.



X-ray scattering data from undecagold in methanol (black) with a best fit model including a constant and a hard sphere of diameter 1.48 nm.

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Education:

To date, this research has been conducted by A. H. Taubert (former postdoctoral fellow now teaching at Univ. of Basil), B. P. Kirkmeyer (Dec. 2003 PhD in Materials Science and currently with International Food and Flavors, Inc.), N. M. Benetatos (PhD, current Materials Science PhD student), and C. Chan (PhD, current Chemical Engineering. In addition, we have benefited from two undergraduate students supported through REU programs, T. Hart and C. Lim.

Kirkmeyer was a finalist for the Padden Award for graduate students in the Division of Polymer Physics of the American Physical Society in March 2003.

Outreach to Women:

Winey continues to serve as a faculty advisor for the Penn chapter of SWE, Society of Women Engineers, and has spoken twice in the previous year about academic careers to predominately women audiences.

Outreach to Industry:

Winey has arranged to spend her scholarly leave at Dupont Experimental Station in Wilmington during the Fall 2004 and the Fall 2005 semesters. This will enable the extension of our morphological studies to industrial applications including fluorinated ion-containing polymers